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CONTENTS

	PAGE
BRYANT, G. E., F.R.E.S. New species of CHRYSOMELIDAE (Coleopt.) from Fiji, British North Borneo and Malaya	249–252
EDWARDS, F. W., M.A., Sc.D., F.R.E.S. On the British LESTREMIINAE, with notes on exotic species.—6. (Diptera, CECIDOMYIIDAE)	229–243, 6 figs.
HINCKS, W. D., M.P.S., F.R.E.S. Passalid Coleoptera from the Celebes . . .	244–248, 7 figs.

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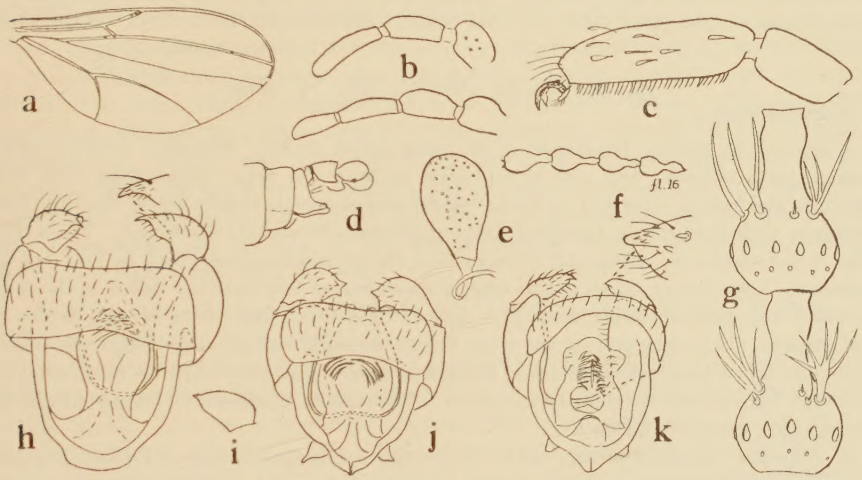
ON THE BRITISH LESTREMIINAE, WITH NOTES ON EXOTIC SPECIES.—6. (DIPTERA, CECIDOMYIIDAE)

By F. W. Edwards, M.A., Sc.D., F.R.E.S.

Aprionus Kieffer (figs. 17–18).

In introducing this genus Kieffer described four species of which he had obtained material of both sexes by rearing, one of these (*spiniger*) being indicated as the genotype. I have taken only two males which I refer with doubt to *spiniger*, but another of Kieffer's species (*digitatus*), which is recognisable with certainty on account of the peculiar form of the male style, proves to be common in



17

Fig. 17.—a–i, *Aprionus flaviventris* (Winn.); j, *A. bidentatus* Kieff. (?); k, *A. spiniger* Kieff. (?). a, ♂ wing; b, palpus (two types); c, last two segments of ♀ front tarsus; d, tip of ♀ abdomen; e, spermatheca (standard scale); f, g, outline of tip of ♀ antenna, with two segments enlarged; h, j, k, hypopygia (British ♂♂); i, variation in ♂ style (Winnertz's type of *albicauda*).

Britain and pending the precise identification of *spiniger* I base my interpretation of the genus on *digitatus*.* The following diagnosis is based on a comparison of about eight British species :—

Eyes undivided, bridges 2–4 (usually 3) facets wide. Front somewhat bilobed. Palpi with either 3 or 4 segments. Antennae of ♂ with 1–3 complete crenulate whorls on each of the 12 flagellar segments. Antennae of ♀ with 11–20 more or less flask-shaped segments in flagellum; sensoria rather variable in form, typically blade-like, sometimes more or less deeply bifid or trifid, usually 4 in number (sometimes 6–8 but never 2), each arising from

* Dr. Felt informs me that there is a pair of *A. spiniger* in his collection, now in the New York State Museum. Up to the time of going to press I have been unable to obtain confirmation of this.

one large pore. Mesonotum rather densely clothed with short hair. Tarsi with small scales; empodium short or rudimentary; claws either simple or with a few fine teeth. Wings: *R*1 under three times as long as *Rs*, usually much less; costa produced, but not reaching tip of *M*; *Cu*2 somewhat curved and reaching margin; macrotrichia as in *Bryomyia*—dense on membrane and most veins, but very few or none on *R*5; pore 5 on *rm*. Hypopygium: tergite large, more or less rectangular; cerci hardly developed; coxites almost separate, united ventrally by a very narrow ribbon-like loop; style various in form, usually with spine-like beak (but not an articulated spine); roots of coxites forming a long internal loop extending well beyond the sternal loop; genital rod absent (except in *spiniger* ?, when it is rudimentary) but aedeagus with from 1 to 8 ventral spines on each side. Spermathecae always single, spherical or pear-shaped, not very large, duct wide but not sclerotised at origin.

The most striking feature of the genus is the structure of the hypopygium, which is unlike that of any other genus of the subfamily. All the species are found about old logs and stumps; often several species may occur around the same stump at the same time, so that correct association of the sexes is difficult.

A. flaviventris (Winn.) (fig. 17, a–i).

(*C. albicauda* Winn.).

A rather large species, the largest of the genus known to me. Blackish, with the membranous parts reddish; legs and hypopygium more or less pale. Mesonotum dull, with dark hair, the hair at sides and on dorso-central stripes conspicuously longer than the rest. Scutellum with 6–12 strong marginal hairs in addition to dorsal pubescence. Palpi with either 3 or 4 segments; when only 3 are present the terminal segment may be long or only moderately long (the variation occurs among specimens of the same sex taken at the same place and time and otherwise identical). Eye-bridges about four facets broad. Scales on tarsi narrow; claws with several fine teeth before the slight subapical swelling; empodium better developed than other species of the genus, fleshy part nearly half as long as claws, one or two hairs almost reaching tips of claws. Venation: *R*1 somewhat longer than in the other species, about 2·5 times *Rs*.

♂. Flagellar segments mostly with two complete crenulate whorls (the first few segments may have only one and the last few may have three) in addition to one or two incomplete ones; necks of middle segments almost as long as the basal part, of penultimate segment more than half as long, terminal segment long and pointed. Hypopygium very long, owing to the great development of the loop formed by the united roots of the coxites, which is longer than in any other species; style with a finely pubescent spine-like beak (variable in length) and a projecting flange on inner side (in some positions giving the appearance of a second beak); aedeagus normally with four slender spines on each side, but occasionally with only three or even two. Wing-length about 2·5 mm.

♀. Flagellum with 16–20 segments, the terminal one usually double, necks long; sensoria in the form of slender curved spines which may be either simple or split into 2–5 branches. Fifth segment of all tarsi darkened; of front tarsus twice as long as fourth and with rather dense pubescence on the sole. Spermatheca rather large, pear-shaped, with numerous pores. Wing-length 3–3·5 mm.

Herts.: Offley, Welwyn; Bucks.: Ivinghoe; Beds.: Whipsnade; Hants.: New Forest; Oxon.: Oxford; Glos.: Symond's Yat; Cheshire: Arden Hall; Surrey: New Malden; Kent: Wye; Sussex: Crowborough. Specimens mostly taken about old beech logs; iv., ix.

This species was recorded by Barnes (1927) as *A. miki* Kieff., but I do not think that identification can be correct, owing to several discrepancies, notably

the presence in this species of a distinct empodium. Owing to a misprint in Barnes' description the number of flagellar segments in the ♀ was given as 12; actually in his specimen there are 16.

A. bidentatus Kieff. (?) (fig. 17, j).

♂. Middle flagellar segments with necks only half as long as nodes (tip of antenna missing in the single specimen examined). Palpi 4-segmented. Empodium rudimentary; claws with only two minute teeth. Vein *R*1 barely twice *Rs*. Hypopygium much resembling *flaviventris*, but interior loop not so long and style with two points. Wing-length only 1·7 mm.

N. Devon: Clovelly, v.1936, 1 ♂ by old beech trees.

I refer this with much doubt to *A. bidentatus*; Kieffer's specimen seems to have been larger and was possibly *A. flaviventris*.

A. spiniger Kieff. (?) (fig. 17, k).

♂. Flagellar segments mostly with two complete crenulate whorls, but several segments at base with only one; necks at most half as long as nodes, on penultimate segment not one-third as long; terminal segment not much longer than broad. Palpi 4-segmented. Empodium rudimentary; claws without obvious denticles. Vein *R*1 barely 1·5 times *Rs*. Hypopygium: differs from that of all other species of the genus known to me in the narrower tergite, in the minutely spinulose tip of the style (the spinules only visible under a very high magnification, *e.g.* $\frac{1}{14}$″ dry objective), and the presence of eight spines on each side of the aedeagus; between the two sets of aedeagal spines a rudimentary genital rod is visible. Wing-length only 1·4 mm.

N. Devon: Clovelly, v.1936, 1 ♂; Hants.: New Forest, 17.x.37, 1 ♂. Both taken about old beech trees.

In describing *A. spiniger* Kieffer states that the tip of the male style terminates in about eight spinules, which at a low magnification appear to form a single tooth. As the above-described species is the only one I have found in Britain which exhibits a comparable structure I provisionally regard it as *A. spiniger*, although the tip of the style is not so markedly spinulose as shown in Kieffer's figure and the size is smaller (length of body under 2 mm.; Kieffer says 2·4 mm.).

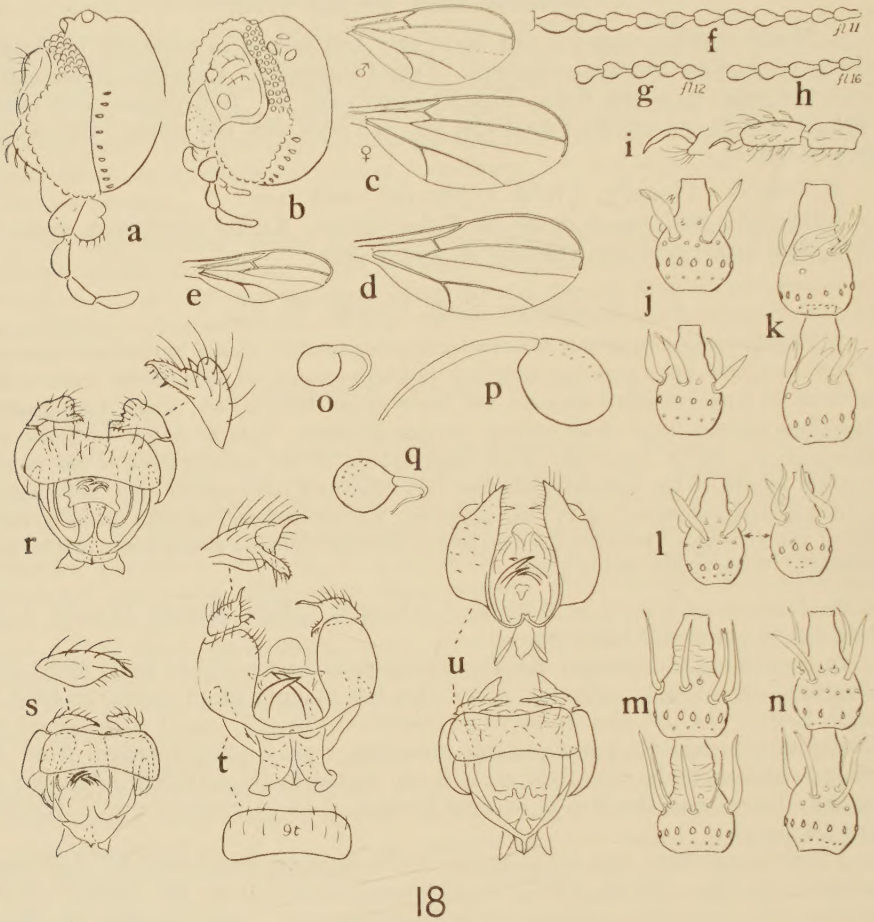
A female specimen lent me from the Berlin Museum and labelled "*Aprionus spinigera* Kieffer, Bitsch, 1894," is indistinguishable from the female of *A. flavidus* and is therefore perhaps wrongly determined; unfortunately the male from which Rübsaamen prepared the figure published by Kieffer does not seem to have been preserved in his collection.

A. flavidus (Winn.) (fig. 18, c, g, j, o, r).

(*A. digitatus* Kieff.).

A small species, mainly blackish but with membranous parts (much of pleura and abdomen) light reddish. Mesonotum slightly shining, hair dark, not so dense as in *flaviventris*, dorso-central hairs not noticeably longer than the rest. Scutellum with 6 or more strong marginal hairs and some short dorsal pubescence. Eye-bridges three facets broad. Palpi as in *flaviventris* with either three or four segments with about equal frequency. Scales on tarsi broader than in *flaviventris* and therefore appearing denser; claws with one or two minute denticles sometimes visible before the slight apical swelling; empodium rudimentary, with a few usually short hairs. Wings narrower than in *flaviventris*; *R*1 under twice as long as *Rs*.

♂. Flagellar segments mostly with only one crenulate whorl, last few with two; necks of intermediate segments over two-thirds, on penultimate segment about half as long as basal portion. Hypopygium distinctive owing to the thumb-like projection on the broad style; two small spines on each side of aedeagus. Wing-length about 1·5 mm.



18

Fig. 18.—*Aprionus* spp., small species. a, b, head showing form of eyes, etc.: a, *flavidus* (?), ♀; b, *miki* (?). c–e, wings: c, *flavidus*, ♂ (British) and ♀ (Winnertz's type); d, *lepidus* (type ♀); e, *brachypterus*. f–h, j–n, outline of ♀ antenna with one or two segments enlarged: f, l, *miki* (?); g, j, *flavidus*; h, m, *acutus*; k, *flavidus*, var. ?; n, *brachypterus*. i, tip of front tarsus with claw more enlarged. o–q, spermatheca: o, *flavidus*; p, *acutus*; q, *miki* (?). r–u, hypopygia: r, *flavidus*; s, *miki* (?); t, *bispinosus*; u, *acutus*.

♀. Flagellum with 12 top-shaped segments, last two sometimes incompletely separated; sensoria broad, just reaching base of succeeding segment, some of them more or less bifid at tip; last segment small, without sensoria. Fifth segment of front tarsus not much longer than fourth, without dense pubescence beneath. Spermatheca roundish. Wing-length nearly 2 mm.

Herts.: Hitch Wood, Offley, Welwyn; Bucks.: Ivinghoe; Hants.:

New Forest; N. DEVON: Clovelly. In all cases about old beech trees, but must occur on other rotting logs (Kieffer recorded the species from sallow).

A female taken in Sherrard's Wood, Welwyn, 22.x.36, possibly belongs to another allied species. It has 14 flagellar segments which are longer than those of *A. flavidus* and with relatively shorter (though similar) sensoria (fig. 18, k). The longer hairs of the empodium reach nearly to the tips of the claws (fig. 18, i). Head as in fig. 18, a.

A. bispinosus sp. n. (fig. 18, t).

♂. Very similar to *flavidus*. Necks of flagellar segments slightly shorter; claws perhaps more slender and quite smooth; empodium rudimentary, with short hairs only. Palpi 4-segmented in all four specimens examined. Hypopygium: style of distinctive shape, with pubescent thumb-like process as in *flavidus* and also with two long divergent bare spines; aedeagus of unique form in having a single very stout spine on each side; interior loop not very long. Wing-length about 1·3 mm.

♀. Unrecognised, unless the above-mentioned specimen with 14-segmented flagellum belongs here.

HERTS.: Hitch Wood, 26.ix.37, 2 ♂♂ (incl. type); Welwyn, 23.ix.37, 1 ♂; BUCKS.: Ivinghoe, 3.x.37, 1 ♂.

A. acutus sp. n. (fig. 18, h, m, p, u).

Very similar to the last two. Palpi longer than in *flavidus*; 4-segmented in all specimens examined (15 ♂♂, 10 ♀♀). Empodium rudimentary, with short hairs; tarsal scales rather broad. Venation: *R*1 in both sexes rather longer than in *flavidus*, about 2·5 times *Rs*.

♂. Flagellar segments rather more slender than in *flavidus*, mostly with two complete crenulate whorls, terminal segment with three. Hypopygium: style small, simple, not very wide even at base and tapering to a sharp point; each coxite produced ventrally into a sharp triangular point; aedeagus with two rather strong spines on each side. Wing-length about 1·7 mm.

♀. Flagellum with 14–16 flask-shaped segments; necks rather long except on penultimate segment, which has no distinct neck; last segment rather small, narrowed distally. Sensoria longer and narrower than in *flavidus*, almost all simple, a few very slightly bifid at tip; the hairs which as usual alternate with the four main sensoria tend to be longer than in most of the other species and some of them are thickened, forming accessory sensoria. Tarsi as in *flavidus*. Spermatheca large, ovate; duct remaining broad for a longer distance than in other species. Wing-length 2·2–2·5 mm., body about 2·5 mm.

HERTS.: Hitch Wood, near King's Walden, series including type ♂, and Sherrard's Wood, Welwyn; taken about old decaying beech logs, ix.–x.36 and ix.37.

A. lepidus (Winn.).

According to my notes on the type this species has the empodium nearly as long as the small claws, but the antennae (♀) are formed very much as in *A. acutus*, the sensoria being quite similar but the number of segments fewer—there are 11 flagellar segments, the tenth without neck and incompletely separated from the eleventh, which is constricted in the middle. The wing (fig. 18, d) is quite similar to that of *A. acutus*. The presence of an empodium seems to preclude the identification of *A. lepidus* with *A. acutus*, apart from the shorter antennae; however, the two seem clearly to belong to the same group of *Aprionus*.

A. miki Kieff. (?) (fig. 18, b, q, s).

A small species resembling *flavidus*. Eye-bridges 2–3 facets broad. Scutellum with 4–6 strong marginal hairs. Palpi with either three or four segments (three in 7 out of 11 specimens examined); when 3-segmented the third segment longer than the second. Scales on tarsi distinct but not quite so broad as in *flavidus*; claws without definite denticles; empodium rudimentary, with a few very short hairs. Wings with *R*1 1·5–1·7 times as long as *Rs*.

♂. Flagellar segments mostly with only one complete crenulate whorl, except last few segments, which may have two; necks mostly three-quarters as long as basal parts of segments, on penultimate segment half as long. Hypopygium small; style broader than in *acutus*, but rather flattened and so varying in apparent shape according to angle of view, with a short, bare, terminal spine-like beak; coxites with a rounded ventral apical projection (much less prominent than the sharp projection of *acutus*); aedeagus with two spines on each side. Wing-length 1·3 mm.

♀. Flagellum with 11 segments shaped much as in *flavidus*; penultimate more oval, without neck, terminal with its distal half smaller. Sensoria much as in *flavidus* but all simple and two of them on each segment strongly curved. Tarsi and spermatheca as in *flavidus*. Wing-length 1·5–1·7 mm.; body 1·7–2 mm.

Herts.: Hitch Wood, 2 ♂♂; Welwyn, 1 ♀; Bucks.: Ivinghoe, 4 ♂♂; Hants.: New Forest, 1 ♂, 2 ♀♀; S. Devon: Sidmouth, 1 ♂. Taken about old beech logs in company with other members of the genus, v., ix.–x.

The three females obtained are rather doubtfully associated with the males. As this is the only species I have seen which answers fairly closely to Kieffer's description of *A. miki* I adopt this name for it. Kieffer did not mention the number of segments in the female antenna.

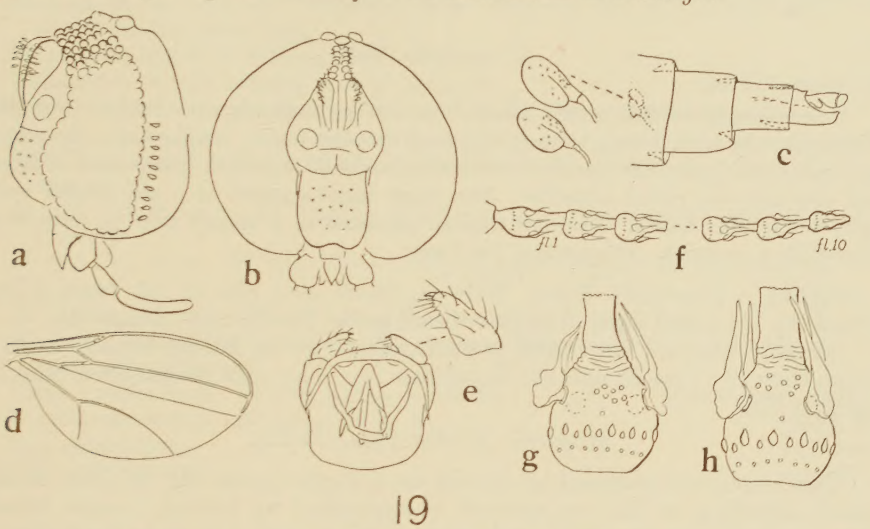
A. brachypterus sp. n. (fig. 18, e, n).

♀. Eye-bridges two facets wide. Antennal flagellum 11-segmented, most segments flask-shaped, the distal part narrowed and almost as long as the basal part, forming a long but ill-defined neck, this shorter but distinct on penultimate segment; sensoria slender, simple, four in number and not very strongly curved; terminal segment without sensoria, constricted in middle, the distal half smaller. Palpi 3-segmented and shorter than in the other species; first segment not much enlarged but with a sensory patch above. Thorax unusually small, brownish and somewhat shining, more scantily haired than in the other species, some long dark bristly hairs at sides of mesonotum and smaller hairs in dorso-central stripes; scutellum with only two marginal hairs (the type is in perfect condition and evidently no scutellar hairs are missing). Abdomen mainly pale (yellowish in the dry specimen), tergites very little darkened, cerci normal. Legs pale; tarsi without obvious scales (possibly rubbed off in mounting); empodium rudimentary or absent; fifth segment of front tarsus about half as long again as fourth, which is less than twice as long as broad, second and third segments also shorter than fifth. Wings noticeably shorter than abdomen and quite narrow, probably useless for flight (the condition appears normal as both wings are alike and not at all crumpled); *R*1 about twice *Rs*. Wing-length 1·0 mm.; body (excluding head, with abdomen not quite fully extended) 1·7 mm.

Cheshire: Longdendale, 24.iv.1932, 1 ♀ (*H. Britten*). Type in British Museum.

Although I have only one specimen, it seems well distinguished, not only on account of the abbreviated wings but of the reduction of the scutellar hairs. Rübsaamen's *Campylomyza dimorphogyna* was described as having the wings abbreviated or absent in the female sex, but cannot be identified with our

species as it has only eight flagellar segments; though listed by Kieffer with *Aprionus* it is perhaps more likely to be a *Monardia* or *Pezomyia*.



19

FIG. 19.—*Trichopteromyia modesta* Will. a, side view of head showing broad eye-bridges (British specimen); b, front view of head (Williston's type); c, tip of abdomen, with spermathecae more enlarged; d, wing of ♂; e, hypopygium; f, outline of ♀ antenna; g, one segment of antenna, Kieffer's type of *Pr. latipennis*; h, ditto, British ♀.

Trichopteromyia Williston (fig. 19).

(*Projoannisia* Kieffer.)

Trichopteromyia modesta Williston, 1896, was described from a single female specimen from St. Vincent, W.I.; *Projoannisia latipennis* Kieffer, 1912, from a single female from the Seychelles Is. The two types are in the British Museum, and except that *T. modesta* has lost its antennae are in fair condition. I have carefully compared them and can find no differences between them; moreover, I have examined a whole series of British specimens which appear to belong to the same species. From this study the following amended diagnosis of the genus may be given :—

Eyes undivided, bridges very broad, about 6 facets wide. Front with a pair of prominent lobes. Palpi 3-segmented, third segment long. Antennae of ♂ with 2 + 12 segments, those of flagellum eccentric, with long necks, and with a single complete crenulate whorl obliquely placed in middle, two rather irregular whorls of simple setae before middle and two or three incomplete crenulate whorls on ventral side beyond middle. Antennae of ♀ with 2 + 10 segments, those of flagellum with long necks and provided with four or five sensoria each arising from one large pore. Mesonotum densely clothed with close-lying scaly pubescence. Wings broad, macrotrichia dense on membrane and all veins (including *R*5); costa produced; *R*1 barely twice *Rs*, which is long and oblique; *M* obsolete distally but distinct at base; *Cu*2 slightly curved, reaching margin; pore 5 on *rm*. Hypopygium small, structure much as in *Monardia* and *Xylopriona* : tergite narrow, coxites largely fused, style with terminal tooth, tegmen shield-shaped, genital rod present. Spermathecae two in number, somewhat retort-shaped and rather small, ovipositor not markedly extensile, cerci unusually small.

The genus is evidently very close to *Monardia* in the sense here understood, differing most obviously in the very broad eye-bridges.

T. modesta Will.

(*C. latipennis* Kieff.)

Colour largely reddish in life, mesonotum and sternopleura dark brown; legs pale. Legs, especially tarsi, densely clothed with small broadish scales; similar scales also present on frontal lobes, palpi and first two or three segments of antennae; pubescence of thorax and abdomen also rather scale-like. Last front tarsal segment of ♀ not swollen but a little longer than fourth. Necks of flagellar segments of ♂ mainly pale (in most other species they are dark). Wing-length 1·8–3 mm.

HERTS.: Sherrard's Wood, Welwyn, taken over pile of oak logs; Hitch Wood, by old beech logs; YORKS.: Goathland; CROMARTY: Dingwall.

As noted above, I am unable to distinguish between British females and the types from St. Vincent and the Seychelles Is. The male is described here for the first time.

Monardia Kieffer (figs. 20–22).

This genus was proposed by Kieffer for a single species (*M. stirpium* Kieff.) which according to him was specially characterised by having a single minute subapical tooth on the claws, rudimentary empodium, four mushroom-shaped sensoria on each of the ten flagellar segments of the female (including the last), a greatly lengthened fifth segment of the front tarsi in the female, and vein *R*1 quite short. The claw character, as pointed out by Felt, seems to be of little importance; the female antennal sensoria are doubtless more significant, but there is so much variation between species of this group that it is difficult to decide on the limits of the genus. For the present I propose to refer to *Monardia* all Campylomyzini which have the following characters in common :—

Eyes undivided, though the bridges may be very narrow (2 facets wide). Palpi with 3 or 4 segments, in the former case the second and third together much longer than the first. Antennal flagellum of ♂ with 12 segments which have one or more crenulate whorls; flagellar segments of ♀ normally with four (sometimes five) sensoria, each arising from a single large pore and usually more or less mushroom-shaped. Tarsi with numerous scales (sometimes very narrow). Empodium either absent or quite narrow. Wings: costa produced; *Cu*2 reaching margin; *R*5 with macrotrichia; pore 5 on *rm*. Hypopygium: tergite moderate or narrow; cerci inconspicuous; coxites extensively united at base beneath; style usually with terminal spine; tegmen shield-shaped; genital rod present. Spermathecae usually two, with narrow ducts.

All the species now placed here are certainly not nearly related, in fact it is easy to recognise several distinct groups, some of which might well be placed in different subgenera or genera; I refrain from proposing names for any of these groups because it is simpler to refer all to *Monardia*; because some of Kieffer's genera founded on larvae only may eventually be proved to apply to them; and because I have not seen the genotype (*stirpium*), which seems in several respects quite different from any of those hitherto found in Britain or America.

I have not observed variation in the number of palpal segments in any species of this genus; this is in contrast with *Aprionus*, where such variation is common.

The following key will indicate the chief characters used for grouping the females (the males, where known, are less readily grouped) :—

1. Sensoria in the form of broad plates arising from several small pores; empodium rudimentary; claws thick in middle . . . . . *antennata.*
   Sensoria in the form of "stemmed discs" (four or five in number), each arising from a single pore . . . . . 2.
2. Empodium absent or rudimentary . . . . . 2.
   Empodium almost or quite as long as claws . . . . . 7.
3. Fifth front tarsal segment four times the fourth; flagellum 10-segmented *stirpium.*
   Fifth front tarsal segment at most twice the fourth; flagellum at least 15-segmented . . . . . 4.
4. *M* and *Cu*1 distinct; *R*1 longer; first segment of palpi covered with scaly sensoria . . . . . 5.
   M and *Cu*1 faint; *R*1 very short; first segment of palpi without obvious sensoria . . . . . *obsoleta.*
5. Abdomen elongate; *R*1 four times *Rs*; mesonotum partly bare . . *magna.*
   Abdomen plump and shortish; *R*1 at most three times *Rs*; mesonotum uniformly pubescent . . . . . 6.
6. Palpi 4-segmented; *R*1 about three times *Rs* . . . . *monilicornis, kollari.*
   Palpi 3-segmented; *R*1 under twice *Rs* . . . . . *ulmaria.*
7. One spermatheca . . . . . *monotheca.*
   Two spermathecae . . . . . *nigricans.*

M. antennata (Winn.) (fig. 20).

A moderately large species, mainly reddish in colour (at least when freshly emerged), with mesonotum and sternopleura blackish. Eye-bridges 3–4 facets wide. Palpi 4-segmented, first segment not very large. Mesonotum with dense close-lying pubescence. Legs densely clothed with small scales, which are broad on tarsi, narrow (and less dense) on coxae. Claws with a marked swelling on inner side near middle, and with one or two minute denticles; empodium rudimentary. Wings broad, venation much as in *Xylopriona*; *R*1 twice to three times *Rs*, latter very oblique; costa produced but not as far as tip of *M*; *Cu*2 curved, continuing faintly to margin. Macrotrichia numerous on *R*5 as well as on other veins and dense on membrane.

♂. Flagellar segments with long necks and mostly with two complete crenulate whorls, the median one the denser. Hypopygium very small for the size of the insect; tergite moderately broad; coxites not extensively fused; style short, oval, without trace of terminal spine. Wing-length 2 mm.

♀. Flagellar segments 22–35 in number, mostly with the basal portions broader than long (breadth relatively greater in specimens with more numerous segments); sensoria in the form of three or four broad plates, each arising from several small pores (thus resembling *Xylopriona* and differing from all other species of *Monardia*). Abdomen plump, ovipositor not extensile, cerci very short, deeper than long. Spermathecae two in number, both large and disc-shaped, dark, without obvious pores. Wing-length 2·2–3 mm.

Herts.: Hitch Wood and Welwyn; Bucks.: Ivinghoe. ix.–x.

The variation in number of flagellar segments in the female is remarkable; it seems to be largely correlated with size, small specimens having fewer and less lenticular segments. It is possible, however, that two distinct forms may be present; this possibility is increased by the fact that in the smallest specimen mounted (fig. 20, d and g) the sclerotised part of the duct of the spermatheca is longer and thinner than in other examples. Winnertz's type female has 23 segments in the flagellum, resembling in shape those of this small specimen.

M. magna sp. n. (fig. 21, c, g, h, l, q).

♀. *Head* dull black above, as usual; face and palpi brownish. Eye-bridges 5 facets broad at vertex, 3–4 at origin, but the facets in the whole eye relatively smaller and more numerous than in many species. Antennae long, with 2 + 30 segments, those of flagellum each with four large flower-like sensoria each arising from a single large pore; necks at first rather short and stout, gradually becoming longer and thinner, those towards tip of antenna rather longer than basal part. Palpi long, 4-segmented, fourth as long as two preceding together; first with upper surface largely clothed with small sensoria. *Thorax* blackish,

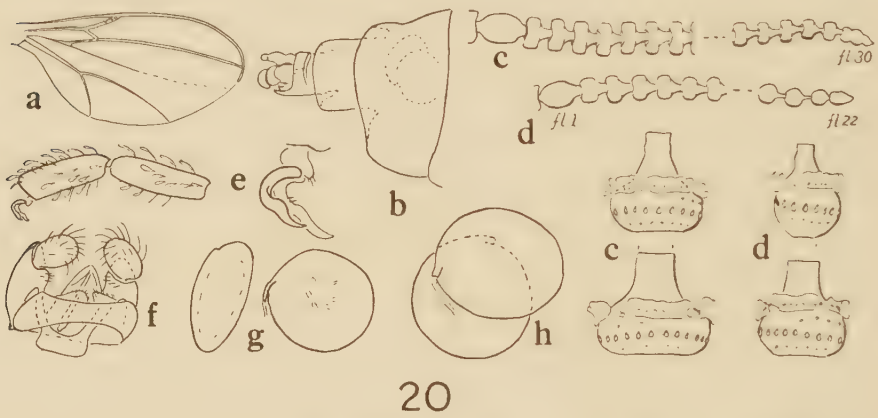


Fig. 20.—*Monardia* (?) *antennata* (Winn.). a, wing of ♂; b, tip of ♀ abdomen; c, d, outline of antennae of ♀ with two segments enlarged; e, palpus; f, hypopygium; g, h, spermathecae; d, g, typical ♀; c, h, var. (?) with more numerous antennal segments.

mesonotum slightly shining, hair chiefly in dorso-central stripes, some rather sparse short hair between these stripes in front but extensive bare areas on each side of them (not due to rubbing). *Abdomen* long and tapering, tergites 2–8 all well developed, longer than broad; spermathecae two, nearly globular. *Legs* mainly dark, but first segment of front and middle tarsi paler except at tip; fourth segment of front tarsi about 2·5 times as long as broad, fifth about 1·3 times fourth; tarsal scales small and inconspicuous; empodium rudimentary; claws long, moderately curved, without obvious thickening. *Wings* blackish owing to rather dense macrotrichia (also on *R*5); *R*1 nearly four times *Rs*; cubital fork unusually long, *Cu*1 over twice as long as stem. Halteres scarcely darkened. Length of body (excluding antennae) 5·5 mm., wing 5 mm.

Herts.: Sherrard's Wood, Welwyn, 22.x.36, 1 ♀ over old fallen cherry tree. This specimen is the largest of the tribe known to me; although evidently allied to the next three it seems quite distinct by vestiture of thorax, venation, etc.

M. ulmaria sp. n. (fig. 21, a, d, i, m, p).

Eye-bridges three facets wide at vertex, two at origin. Palpi 3-segmented, first with dense sensoria as in *M. magna*. Mesonotum dull, fairly uniformly though not very densely clothed with short decumbent hair. Tarsal scales very narrow; empodium absent; claws simple. Wings narrower than in *magna*; *R*1 only 1·5–1·7 times *Rs*; macrotrichia not so dense, few on *R*5; *Cu*2 nearly straight; *M* distinct throughout.

♂. Flagellar segments with one basal hair-whorl and with only one crenulate whorl, and

even on this some of the hair-bases on the upper surface are disconnected; necks mostly rather longer than basal parts of segments; first few segments with two sensoria similar to those of ♀, but smaller. Hypopygium of the usual *Monardia* type; tergite rather broad; style with terminal tooth. Wing-length 2 mm.

♀. Flagellum with 16 segments formed much as in *magna*, mostly with necks almost as long as basal part; terminal segment without sensoria but constricted beyond middle. Fourth segment of front tarsus barely 1·5 times as long as broad, fifth nearly twice fourth. Spermathecae two, collapsed in the single specimen examined, but apparently nearly round. Cerci roundish. Wing-length 2·5 mm.

Bucks.: Chesham, 9.v.1898, bred from rotten elm stump (*E. G. Elliman*), 3 ♂♂, 1 ♀. Type ♀ in British Museum.

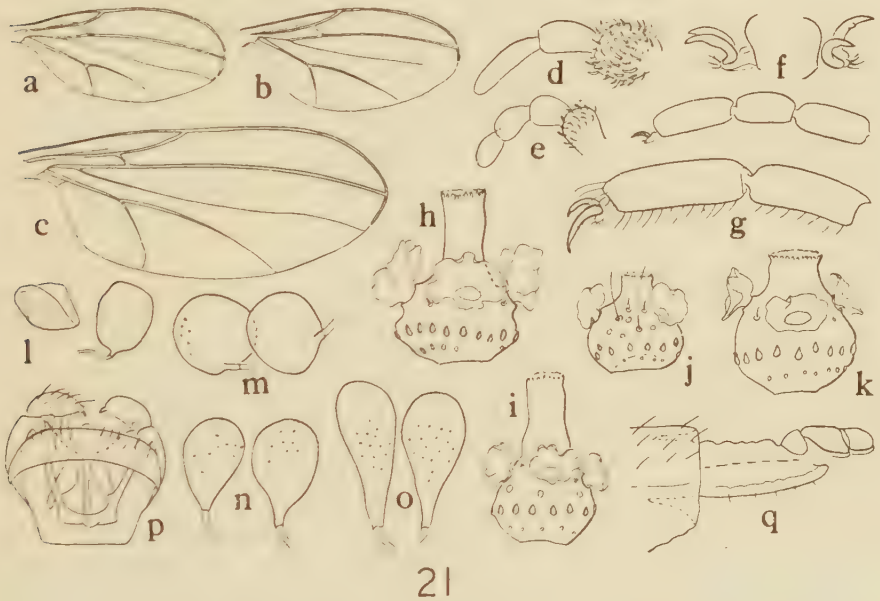


Fig. 21.—*Monardia*, larger species. a, d, i, m, p, *ulmaria*; b, e, f, j, o, *kollari*, cotype ♀; k, n, *monilicornis* (Scottish ♀); c, g, h, l, q, *magna*. a–c, Wings; d, e, palps; f, g, tip of ♀ front tarsus; h–k, enlarged single segments of ♀ antenna (same scale); l–o, spermathecae (same scale); p, hypopygium; q, tip of ♀ abdomen.

M. monilicornis (Zett.) (fig. 21, k, n).

Eye-bridges 4–5 small facets wide. Front slightly bilobed. Palpi 4-segmented, clothed with scales, first with patch of sensoria above, second, third and fourth subequal in length. Mesonotum dull, with fairly dense short decumbent hair. Tarsal scales fairly broad on last few segments; empodium absent; claws with slight enlargement in middle. Wings rather broad, with dense macrotrichia; *R*1 about three times *Rs*; *M* distinct but not quite reaching margin; *Cu*2 rather bent down at tip.

♂. Not identified.

♀. Flagellum with 17 to 20 segments, the terminal one with constriction near middle and with smaller distal portion; necks of first few segments quite short, and even those of the distal segments hardly more than half as long as the basal portion; four flower-like sensoria

as in *magna* and *ulmaria*. Fifth segment of front tarsi barely 1·5 times as long as fourth and not any stouter. Abdomen rather short and plump, tergites broader than long, ovipositor not extensile; spermathecae pear-shaped, with few pores. Wing-length 3–4 mm.

Cambs.: Cambridge (*Jenkinson*); Oxon.: Oxford (*Hamm*); Banff: Falls of Tarnash (*Coe*); Aberdeen: Ballater (*King*); Inverness: Nethy Bridge (*King*).

From information supplied me by Dr. Kemner regarding Zetterstedt's type, I think this identification must be correct. I have seen a long series of females of this species from the collection of the German Entomological Institute, taken in the neighbourhood of Berlin.

M. kollari (Winn.) (fig. 21, b, e, f, j, o).

Winnertz described this species from two females in the Vienna Museum, which I have examined; one of them is illustrated here. The specimens show most of the characters of *M. monilicornis* as described above, but have the spermathecae much more elongate, a wing-length of only 2·1 mm., and the eye-bridges only two facets wide at origin (the narrowest point). They probably represent a distinct species allied to *M. monilicornis*.

Judging from his description and figures, Felt's *M. lignivora* must be very similar to *M. kollari*, if it is not the same species.

M. obsoleta sp. n. (fig. 22, e, f, n, o, r).

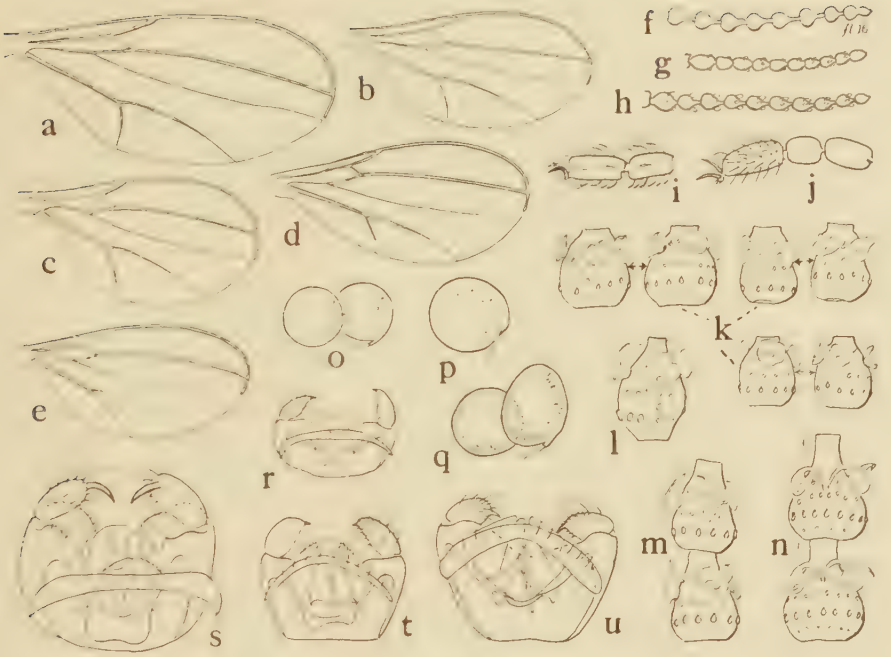
A small species with venation resembling that of *Mycophila*, veins *M* and *Cu*1 being very faintly indicated except at base. Eye-bridges two facets wide at origin, three at vertex. Palpi 3-segmented, first not very large and without obvious sensoria, third over twice as long as second (perhaps sometimes divided into two, though this is not the case in any of the eight specimens examined), all three with numerous scales similar to those of the tarsi. Mesonotal hair scanty, almost confined to sides and dorso-central stripes, not very short. Tarsi with rather dense and rather broad scales; empodium rudimentary; claws almost smooth. Wings with macrotrichia fairly dense, including a row on *R*5.

♂. Flagellum with 12 segments as usual in this genus, ornamentation similar to the other small species; no obvious sensoria; basal enlargements hardly longer than broad, necks mostly distinctly longer than basal portions of segments; neck of penultimate segment half as long as the others. Wing with *R*1 barely 1·5 times *Rs*. Hypopygium of the usual type of the genus; tergite narrow; styles tapering to tips with rather short terminal spine. Wing-length 1·3 mm.

♀. Flagellum with 15–17 segments mostly with necks two-thirds as long as basal enlargements, shorter as usual on first few and almost absent on penultimate segment; four sensoria on each segment except the last, these disc-shaped but with a long point, the points (except sometimes one of the four) curved inwards. Last two segments of front tarsi subequal. Wing with *R*1 about twice *Rs*. Abdomen only slightly extensile, spermathecae two in number, moderately large, roundish, darkened round edges and paler in middle. Wing-length 1·6–1·8 mm.

Bucks.: Ivinghoe, 3.x.37, 1 ♂: Herts.: Welwyn, 22.x.36, 1 ♀ and 30.ix.37, 1 ♀; Hitch Wood, ix.36, 1 ♀ (type) and ix.–x.37, 3 ♀♀; Hants.: New Forest, 17.x.37, 1 ♀.

Apart from the obsolete veins *M* and *Cu*1 (which may be in part due to immaturity of the specimens examined) this species seems rather well distinguished from others with rudimentary empodium by the form of the antennal sensoria.



22

FIG. 22.—*Monardia* small species, and *Pezomyia*. a–e, Wings, about twice scale of most other wings figured; f–h, outlines of ♀ antennae, standard scale; i, j, tips of ♀ front tarsus; k–n, enlarged antennal segments of ♀, standard scale; o–q, spermathecae, standard scale; r–u, hypopygia, r to standard scale, others more enlarged. a, u, sp. indet.; b, h, j, l, *vanderwulpi*, macropterous form?; c, g, k, q, s, *nigricans*; d, i, p, m, t, *monotheca*; e, f, n, o, r, *obsoleta*.

M. monotheca sp. n. (fig. 22, d, i, p, m, t).

A small blackish species, differing from all those described above in having a distinct empodium, which, though narrow, is almost as long as the claws. Eye-bridges two facets wide at origin, three or four at vertex. Palpi 4-segmented, first not very large, with inconspicuous sensory patch above, second, third and fourth subequal. Tibiae with hair-like scales; tarsi with dense narrow scales on last few segments; claws very slightly swollen before the tip. Wings with moderately dense macrotrichia, including a row on *R*5; *R*1 about twice *Rs*, which is oblique; costa produced as far as level of tip of *M* (*M*, however, does not distinctly reach the margin); *Cu*2 very faint at tip, fork moderately wide.

♂. Flagellum with one basal hair-whorl, and one complete oblique crenulate whorl beyond middle, the hairs of which are wider apart and just disconnected at base on dorsal surface; necks of intermediate segments about as long as basal part, that of penultimate segment not much shorter; first few segments with small sensoria similar in shape to those of ♀. Hypopygium (fig. 22, t) of the usual type of the genus and without striking features; tergite very narrow; style with moderate apical spine. Wing-length 1·3 mm.

♀. Flagellum with 11 segments, first long and oval, rest top-shaped, the last few shorter and with less definite necks than those towards the base; each except the last with four sensoria in the form of short-stemmed discs but each with one curved pointed projection towards one side (somewhat as in the last species but less developed). Last segment of front tarsi not at all swollen and barely half as long again as fourth, which is about twice as

long as wide. Only one spermatheca present, this large and disc-shaped, with few pores. Wing-length 1·5 mm.

HERTS.: Welwyn, 30.ix.37, 1 ♂; Hitch Wood, ix.–x.36, 2 ♀♀. Type ♀.

A single male from Ditchley, Oxon., probably represents another species related to the one described above. It is similar in most respects to the Welwyn male, but is larger (wing-length 1·8 mm.), has 3-jointed palpi, and lacks sensoria on the basal flagellar segments; the wing (fig. 22, a) has *M* distinct throughout and the cubital fork rather wider and the hypopygium (fig. 22, u) has the tergite broader and differs in other details.

M. nigricans sp. n. (fig. 22, c, g, k, q, s).

A small black species. Eye-bridges two facets wide at origin, three or four at vertex; front not obviously bilobed. Palpi 3-segmented, first somewhat swollen but without obvious sensoria, second barely twice as long as wide, third not much longer, without scales. Mesonotum with scanty hairs. Tarsi with very narrow, almost hair-like scales; empodium narrow but as long as claws and hairy beneath for its whole length; claws with slight subapical swelling. Wings in both sexes with *R*1 only about as long as *Rs*; costa reaching as far as tip of *M*, which is very faint; macrotrichia on membrane much sparser than in most other species, so that wing appears paler.

♂. Flagellum with 12 segments as usual, these not much longer than broad with necks mostly a little shorter than basal enlargement, neck of penultimate segment short or very short. Wings very broad. Hypopygium of the usual type of the genus, chiefly notable for the long, stout, terminal spine of the style; connecting bridge of roots of coxites broad. Wing-length 1–1·2 mm.

♀. Flagellum with 9–10 segments (usually 10) with very short or scarcely distinguishable necks, exact shape rather variable, but rarely much longer than broad (three rather different specimens shown in fig. 22, k); four (sometimes five) sensoria on each segment except usually the last one, these in the form of short-stemmed discs with the margin at most slightly irregular. Front tarsi with fourth segment not much longer than broad, fifth half as long again as fourth and somewhat stouter. Abdomen moderately extensile; spermathecae two, disc-shaped, darkened round edges. Wings narrower than in ♂; length 1·2–1·5 mm.

HERTS.: Letchworth, not infrequent on windows, vii.–ix.; Hitch Wood, Todd's Green and Breachwood Green (incl. type ♂), at edges of woods, v., ix.–x.; DEVON: Sidmouth, ♀♀ numerous on windows of beach shelter, vi.38; GLOS.: Chedworth, on window, vi.36; OXON.: Oxford Museum windows. SHROPSHIRE: bred, "oats after clover ley," iii.1936 (*H. C. F. Newton*), slides in Barnes Coll., Cecid. 2732–3.

This is evidently very similar to the American *M. gilletti* Felt and *M. toxicodendron* Felt, and is possibly the same as one or other of these; however, I think it more likely that it is one of a group of allied species of which several may occur in Britain, more than one being perhaps represented among the specimens listed above.

The male from Shropshire differs from those from Herts. in having the necks of the flagellar segments only about half as long as the nodes and the penultimate segment devoid of neck; the female bred with this male is aberrant in having pore 5 on *R*5 instead of on *rm*, a variation which I have not observed in any other species of the tribe.

A very small female from Harrow (taken on window, 2.viii.1915), with 8-segmented flagellum and wing-length only 0·8 mm., probably represents another related species.

Pezomyia Kieffer.

This genus was erected by Kieffer for *Monardia vanderwulpi* De Meij., a species which is normally brachypterous but was said by the describer to occur also in a macropterous form. Hitherto only the brachypterous form has been found in Britain (recorded by me in 1925, *Ent. mon. Mag.* **61** : 228 from Barnsley, Yorks.) and I have expressed doubt as to whether de Meijere's macropterous form actually belonged to the same species. However, I have now examined some normally-winged specimens which are in other respects so much like *P. vanderwulpi* that if not actually the same species they must certainly belong to the same genus. These specimens show almost all the characters of *Monardia* as defined above, the only features which one might treat as of sufficient importance for generic separation from *Monardia* being the following: (1) the very short palpi, with second and third segments together only about as long as the first; (2) the entire absence of scales on the legs; and (3) the elongate cerci.

The following is a description of 2 macropterous females taken by Mr. A. H. Hamm in his garden at Oxford, 13.vi.1915 :—

♀. Eye-bridges three facets wide. Palpi 3-segmented, first large, with distinct sensory patch above, second and third both small, together hardly longer than first. Flagellum (fig. 22, h) with 10 segments, all except the last distinctly longer than broad, with short but distinct necks and with four disc-like sensoria inserted near tip (fig. 22, l); last segment smaller, pointed, without sensoria. Mesonotal hair short, almost confined to sides and dorso-central stripes. Legs with hairs only, no scales even on tarsi; empodium absent; claws almost smooth; fourth segment of front tarsus less than half as long again as broad, fifth about twice as long as fourth (fig. 22, j). Wings (fig. 22, b) with scanty macrotrichia which are longer and more slender than in most species, some present on *R*5; *R*1 not much longer than *Rs*, which is almost transverse (much less definitely oblique than in the other species); costa reaching as far as tip of *M*, which is very faint; *Cu*2 curved to margin. Halteres normal. Abdomen with moderately extensile tip; cerci unusually long and narrow; spermathecae two, round and of moderate size. Wing-length 1·3 mm.

Two very similar females are in Dr. H. F. Barnes' collection (slides Cecid. 1039–40) labelled " Adel, Leeds, 1928, Caught over hazel stump." In structure of antennae, palpi, legs and abdomen these are exactly like the brachypterous females from Barnsley, and it seems worth noting that the antenna closely resembles that of *M. stirpium* as figured by Kieffer, except that the last segment lacks sensoria.

The following details may be added regarding the typical (brachypterous) form of *P. vanderwulpi* (Barnsley specimens) :—

♂. Eye-bridges two facets wide. Flagellar segments (12) with one incomplete and scarcely oblique crenulate whorl, the " crenulation " between the hair-bases lacking on the dorsal surface and the hairs sparser than usual; necks almost as long as basal enlargements, on penultimate segment about half as long. Wings very narrow and strap-shaped, but longer than thorax; *R*1 very short, *rm* scarcely oblique; *R*5 straight and ending in tip of wing; *Cu* straight, without fork. Halteres represented by minute knobs. Hypopygium small, of the usual *Monardia* type; tergite moderately broad; style rather stout with very small terminal tooth.

♀. Eye-bridges only 1–2 facets wide, facets irregular. Flagellar segments exactly as in the macropterous form. Wings reduced to minute stumps less than half as long as the small thorax and without venation. Halteres absent.

— PASSALID COLEOPTERA FROM THE CELEBES

By W. D. Hincks, M.P.S., F.R.E.S.

The present paper is based on a small but interesting series of ten examples collected by Mr. G. Heinrich and submitted for identification by Mr. G. J. Arrow. The specimens are preserved in the British Museum and my sincere thanks are due to Mr. Arrow for the opportunity of examining them.

Small though the collection is, there appears to be two forms which are undescribed, a species of the endemic genus *Plesthenus* and a *Macrolinus*. Regarding the former, I long debated whether to erect a new genus for its reception together with Heller's *Plesthenus mandibularis*, but finally I have decided to await further material before doing so.

The distribution of the Celebean Passalid fauna is interesting and has been discussed by Gravely (1918 : 123). Below are listed the species recorded from the islands in the *Colcopterorum Catalogus* (Hincks and Dibb, 1935) together with their known distribution.

List of Celebean Passalidae.

Aulacocyclinae.

Comacupes foveicollis ssp. *minor* Heller 1896. Type form from Borneo; subsp. endemic.
Aulacocyclus celebensis Heller 1898. Endemic.

Macrolininae.

Macrolinus sulciperfectus Kuw. 1891. Endemic.
Macrolinus punctipectus sp. n. Endemic.
Macrolinus duivenbodei Kaup 1868. Endemic.
Macrolinus urus Heller 1898. Endemic.
Aceraius laevicollis (Ill. 1800). Malay Pens., Sunda Is. to Philippines, Celebes ?
Plesthenus laminatus sp. n. Endemic.
Plesthenus mandibularis Heller 1900. Endemic.
Plesthenus invitus Kuw. 1891. Endemic.
Plesthenus quadricornis (Kaup 1868). Endemic.
subsp. *gelon* (Schauf. 1885). Endemic.
Plesthenus scutellopunctatus Zang 1903. Endemic. Status doubtful.

Leptaulacinae.

Trichostigmus ursulus (Schauf. 1885). Endemic.
Leptaulax planus (Ill. 1800). Burma, Siam, Malay Pens., Sunda Is.
Leptaulax bicolor (Fabr. 1801). Whole Indo-Australian Region.
Leptaulax cyclotaenius Kuw. 1891. Himalayas, Assam, Tonkin, Burma, Malay Pens., Sunda Is.
Leptaulax dentatus (Fabr. 1792). Whole Indo-Australian Region.
Leptaulax anibarbis Kuw. 1898. Borneo, New Guinea.
Leptaulax macassariensis Schauf. 1885. Endemic. Status doubtful.

MACROLININAE.

Key to Celebean Species of *Macrolinus* Kaup.

1. Central tubercle of head with free apex . . . *M. duivenbodei* Kaup 1868.
   Central tubercle of head without free apex . . . . . 2.
2. Large, rather convex species (36–42 mm.); elytra usually fused; frontal ridges obsolete in front . . . . . *M. urus* Heller 1899.
   Smaller (circa 28 mm.); parallel-sided, not very convex; elytra free; frontal ridges more or less complete . . . . . 3.
3. Antennal lamellae long and slender . . . . *M. sulciperfectus* Kuw. 1891.
   Antennal lamellae shorter, especially first three. . *M. punctipectus* sp. n.

Macrolinus punctipectus sp. n.

Antennae with six lamellae, first three short, distal three moderately long. *Labrum* with anterior margin almost straight. *Head* with depressed areas closely covered with large hair-bearing punctures; outer tubercles symmetrical, conical, somewhat shouldered externally; inner tubercles obsolete; frontal ridges complete but not very clearly defined distad; depressed frontal area with large punctures, surrounding raised areas less punctured; central tubercle not free, more or less ridge-like, meeting in front the conjoined frontal ridges where a small more or less tumid area occurs; a deep longitudinal groove directed caudad from base of central tubercle. *Pronotum* transverse, sparingly punctate above anterior angles and scars; marginal groove expanded distad; median groove distinct and interrupted cephalad and caudad; sides with numerous hair-bearing punctures throughout their length, most dense near scars, fewer in anterior angles. *Elytra* parallel-sided, free, rather depressed dorsad; all striae distinctly but not transversely punctured; lateral grooves more strongly punctured than dorsal; shoulders with distinct though sparse hair-tufts. *Mentum* with a few punctures mesad, strongly and rugosely punctured with long hairs laterad. *Metasternum* impunctate on disc; anterior intermediate and lateral areas also posterior angles with large hairless punctures. *Abdomen* polished, with rugosely punctate scars; base of first segment dull and finely sculptured; posterior intercoxal area dull and rugose; coxal plates punctate; ultimate sternite with impressed apical groove. *Length* 27·5 mm.

Locality: S.O. CELEBES: Berg Tangke Salokko, 1500 m., 1–15.i.1932 (*G. Heinrich*). *Type* and *paratype* in British Museum (Natural History).

This species is closely allied to *D. sulciperfectus* Kuw., from which it differs most obviously in having shorter antennal lamellae. Although Kuwert does not directly mention the length of the antennal lamellae in his species I believe I am correct in applying the name to a specimen in the Hincks and Dibb collection from S. Celebes: Bantimoeroeng (*C. Ribbe*, 1883).

Plesthenus Kaup 1871.

Plesthenus was erected by Kaup in 1871 for *Eriocnemis quadricornis* Kaup, erroneously recorded as from Australia. In the *Coleopterorum Catalogus* (Hincks and Dibb, 1935) four species and one subspecies appear under the genus, all of which are confined to the Celebes except for an unconfirmed record of a single example of *P. invitus* Kuw. from Siwi, New Guinea, made by Moreira (1932). The only recent author to deal with *Plesthenus* is Gravely (1918), who knew *P. invitus*, *P. quadricornis* and *P. gelon* and regarded *P. mandibularis* and *P. scutellopunctatus* as possible varietal forms of *P. quadricornis*. At least in regard to *P. mandibularis* Gravely's suspicion was unwarranted; indeed this species is very distinct from the genotype, *P. quadricornis*. Zang (1906), who was a keen etymologist as well as entomologist, regarded *Plesthenus* as pre-

occupied by *Plisthenes* Stål 1864, and coined the euphonious *Embryulcus* in its stead. The close relationship between the oriental *Pelopides* Kuw. and the present genus is obvious.

Key to species and subspecies of Plesthenus *Kaup.*

Zang's *P. scutellopunctatus* is unknown to me and is therefore not included. As suggested by Gravely, it may be only a form or variety of *P. quadricornis.*

1. Upper tooth of left mandibles massive, very prominent; lower basal angle of left mandible with strong tooth; anterior lower tooth of right mandible close to terminal teeth and directed forwards; right mandible broad basad with small upper tooth; pronotal scars hairless; lateral elytral grooves distinctly punctate . . . . . 2.

   Upper tooth of left mandibles normal; lower basal angle of left mandible without tooth; anterior lower tooth of right mandible less close to terminal teeth and directed inwards; right mandible less broad basad with large upper tooth; pronotal scars hairy; lateral elytral grooves almost impunctate . . . . . 3.

2. Truncature of right outer tubercle oblique; upper angle closer to inner tubercle than to lower angle; left outer tubercle acute; upper tooth of left mandible with more or less straight upper edge and oblique inner surface ending in two tubercles; scars of mentum lightly impressed, not very distinct, widely spaced. L. 48 mm. . . . . *P. laminatus* sp. n.

   Truncature of right outer tubercle vertical; upper angle closer to lower angle than to inner tubercle; left outer tubercle truncate; upper tooth of left mandible with outer edge concave, upper inner margin with a median tubercle and another near base; scars of mentum deeply impressed, distinct, less widely separated. L. 34–36 mm.* *P. mandibularis* Heller 1900.

3. Outer tubercles truncate, more or less symmetrical (left a little shorter and narrower than right). L. 45–46 mm.† . . . *P. invitus* Kuw. 1891.

   Outer tubercles asymmetrical; right much larger than left, truncate except when latter is obsolete, then acuminate; left outer tubercle acute or obsolete 4.

4. Right outer tubercle more abruptly truncate; left outer tubercle more strongly developed. Size smaller, 50–55 mm.‡ North Celebes *P. quadricornis quadricornis* (Kaup 1868).

   Right outer tubercle acuminate or very obliquely truncate; left outer tubercle more or less obsolete. Size larger, 57–65 mm. South Celebes . . . . . *P. quadricornis gelon* (Schauf.).

Plesthenus laminatus sp. n. (figs. 1–4).

Antennal club with three short and three long lamellae. *Mandibles*: upper tooth of left mandible massive, very prominent, upper edge more or less straight, an oblique laminate extension on inner face culminating in an anterior and submedian projection (fig. 4); lower basal angle of left mandible with strong tooth; anterior lower tooth of right mandible close to terminal teeth and directed forwards; right mandible broad basad with small upper tooth. *Head* with left outer tubercle apparently acute, simple; right outer tubercle very obliquely truncate, upper angle closed to inner tubercle §; inner tubercles prominent, closer together than are outer tubercles, joined by ridge which also joins them to outer

* Heller gives size as 35–43 mm.

† Gravely records an example without locality as 53 mm. long.

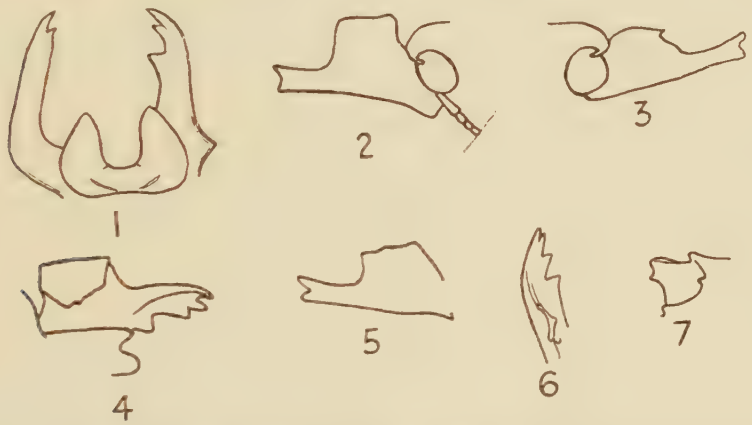
‡ Gravely's measurements are from anterior margin of labrum to apex of abdomen. Mine include mandibles.

§ Or both outer tubercles might be regarded as acute, in which case a secondary tubercle is present on the right side placed nearer to the inner than to the outer tubercle.

tubercles; area enclosed by ridges oblique, roughened; caudal portions of head polished, smooth; central tubercle small. *Pronotum* transverse, impunctate, with hairless scars; median sulcus absent. *Elytra* finely though distinctly punctured laterad. *Mentum* scars rather widely separated, lightly impressed, imperfect in front; side pieces not strongly punctured. *Mesosternum* with distinct oval impunctate scars. *Metasternum* with anterior intermediate areas, lateral areas and posterior angles bearing piligerous punctures; posterior intermediate areas with large umbilicate punctures. *Abdomen* with numerous hair-bearing punctures on first sternite. *Length* 48 mm.

Type unique in British Museum. *Locality* : Celebes (*G. Heinrich*).

This fine insect is evidently closely allied to Heller's *P. mandibularis* and may prove to be a large form or subspecies comparable with the subspecies *gelon* (Schauf.) of *P. quadricornis* (Kaup). However, I think this to be unlikely and on the evidence before me I feel compelled to regard the present specimen as a distinct species.



Figs. 1–7.—1. Underside of mandibles and mentum of *Plesthenus laminatus* sp. n.; 2. lateral view of left mandible of same; 3. lateral view of right mandible of same; 4. inner lateral view of left mandible of same; 5. lateral view of left mandible of *P. mandibularis*; 6. the same, dorsal aspect; 7. dorso-lateral view of right outer tubercle of same.

Plesthenus mandibularis Heller 1900 (figs. 5–7).

Celebes (*G. Heinrich*) : 1 example 36 mm. long.

Celebes : Latimodiong Geb., 1600 m., 2.viii.1930 (*G. Heinrich*), 1 example 34 mm. long.

Upper tooth of left mandible massive, crested; upper margin, seen from above, triangular, composed of three tubercles, a fourth placed below level of others on inner side (fig. 6). Inner tubercles joined by a strong, straight ridge to each other and to outer tubercles. Outer tubercles "double," the anterior part of head being oblique, so that when viewed from above the outer tubercles appear simple and conical but in side view a further angle is seen below them (fig. 7).

Plesthenus invitus Kuw. 1891.

Celebes : Ile-Ile, 1300 m., 15.xi.30 (*G. Heinrich*), 1 example.

Length 45 mm. Very similar to small *P. quadricornis* (Kaup), but readily separable by the almost symmetrical outer tubercles and smaller size.

Gravely (1918) records three examples differing somewhat *inter se*: (1) 45·5 mm. Tondano, Minahassa, (2) 45·5 mm. Menado, (3) 53 mm. without locality. The specimen collected by Mr. Heinrich appears to agree with Gravely's (2). Moreira (1928) gives a locality record of this species without further details (except size, 45 mm.) from Siwi, New Guinea. Heller (1900) is the only other author referring to this species and mentions a specimen in the Dresden Museum (No. 9420) in describing his *P. mandibularis*.

Plesthenus quadricornis (Kaup 1868).

N. Celebes : Magondouw (Staudinger), 9 examples in coll. Hincks and Dibb; N. Celebes : Totok (Janson), 2 examples in coll. Hincks and Dibb; N. Celebes : Tondano, 1 example in coll. Hincks and Dibb. Apparently not taken by Mr. Heinrich during his stay in the Celebes.

Plesthenus quadricornis gelon (Schauf. 1885).

S.O. Celebes : Mengkoha Geb., Wawo, 16–30.i.32 (*G. Heinrich*), 1 example.

Leptaulacinae.

Leptaulax dentatus (Fabr. 1792).

Celebes : Bonthain Wawa Karaeng, 1100 m., ix.–x.1931 (*G. Heinrich*), 1 example. This specimen is not typical in the scanty punctation of the pronotum.

Leptaulax bicolor (Fabr. 1801).

Celebes : Bonthain Wawa Karaeng, 1100 m., ix.–x.1931 (*G. Heinrich*), 1 example; Celebes : Latimodiong Geb., 1000 m. (*G. Heinrich*), 3.viii.1930. 1 example.

The Bonthain example is 19 mm. long and quite typical of this variable species. The second specimen is 24 mm. long and differs in its reduced pronotal and metasternal punctation.

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NEW SPECIES OF CHRYSOMELIDAE (COLEOPT.) FROM FIJI, BRITISH NORTH BORNEO AND MALAYA

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Cryptocephalinae.

Coenobius marginipennis sp. n.

Pale fulvous; prothorax impunctate, the sides with an oblique depression; elytra finely punctate-striate, narrowly margined with fuscous. L. 2·5 mm.

Head pale fulvous, impunctate, the upper part entirely occupied by the eyes; antennae with the five basal segments fulvous, the six terminal segments tinged with fuscous, and broader, the basal segments very long almost as long as the second to fourth together, the second segment very short and rounded, ♂ with the antennae slightly longer than the ♀. Prothorax pale fulvous impunctate, shining, narrowed in front, the anterior margin with a deep transverse groove, the sides with an oblique groove, the base produced into a lobe at the middle; scutellum pale fulvous, impunctate, narrowly elongate; elytra pale fulvous with narrow fuscous margin, finely punctate-striate, the interstices at the sides slightly convex; pygidium closely punctured and clothed with very fine golden pubescence; legs pale fulvous; underside pale fulvous, clothed with fine scattered golden pubescence, almost impunctate, the first ventral segment very long, the second and third very short about equal, and the apical segment about equal to the second and third together.

Fiji Islands: Labasa, 17.ix.1923, *W. Greenwood*; 3 specimens. Lautoka, 19.iv.1919, Cuvu, 5.viii.1915, *R. Veitch*; 2 specimens. Taveuni, 14.xi.1923, *Dr. H. S. Evans*; 2 specimens.

Type in British Museum from Labasa. Described from 2 ♂♂ 3 ♀♀.

Allied to *C. melanocephalus* Jac., from Mashonaland, but differs in the much finer punctation of the elytral striae, and in the head, apex of the elytra and abdomen not black.

Eumolpinae.

Nodostoma musae sp. n.

Broadly ovate, fulvous, nitid, antennae filiform the terminal segments fuscous, prothorax transverse, angled at the sides before base, finely punctured, elytra aeneous, punctate-striate. L. 3–3·50 mm.

Head fulvous finely and not closely punctured, the labrum and palpi fulvous. Antennae long and slender, extending to the middle of the elytra, fulvous with the three terminal segments tinged with fuscous; the third and fourth segments longer and narrower than the remainder; prothorax fulvous, very transverse the sides angulate near the base, obliquely narrowed in front, finely and not closely punctured. Scutellum fulvous, impunctate. Elytra aeneous, subquadrately-ovate, depressed below the base, shoulders prominent and nitid, a strong slightly curved carina at the sides extending from below the shoulder to the middle of the elytra, strongly punctate-striate, the punctures finer towards the apex, the intervals slightly convex. Legs fulvous, the femora armed with a very small tooth, the intermediate and posterior tibiae emarginate at apex. Underside fulvous tinged with fuscous, slightly pubescent, prosternum strongly punctured, the ventral segments of the abdomen, the first the longest, the second to the fourth about equal, with fine scattered pubescence.

Malaya: Jelebu, 15.xii.1934, *G. H. Corbett*; 7 specimens. Serdang, 16.i.1935, *G. H. Corbett*; 5 specimens. Kuala Lumpur, 26.i.1925, *G. H. Corbett*; 2 specimens.

Type in the British Museum from Serdang. Described from 14 specimens.

Reported feeding on *Musa sapientum* L. Allied to *N. frontale* Baly from Malacca, but differs in the sides of the prothorax being more angulate, and in the punctation. This is evidently a very variable species as regards colour.

Entirely fulvous (probably immature), aeneous with the head fulvous, or head and prothorax fulvous with the elytra aeneous. This I have taken as the typical form as the ♂ and ♀ do not differ in colour.

Nodostella pendleburyi sp. n.

Elongate, more or less testaceous, with a metallic tinge, the head and prothorax with darker patches, the elytra with an irregular darker pattern. L. 6 mm.

Head testaceous with darker patches, two between the eyes and one at the base, rugosely punctured, the punctures closer and finer at the base, and fewer on the vertex, the clypeus testaceous. Antennae long and slender extending well beyond the base of the elytra, the two basal segments more swollen, the third slender and twice as long as the second, the remaining terminal segments each about equal to the third. Prothorax strongly transverse, the sides angulate behind the middle, the anterior and posterior margins testaceous, the remainder darker with a metallic tinge, irregularly punctured. Scutellum testaceous, impunctate. Elytra elongate, wider at the base than the prothorax, with a short depression below the base, very feebly punctate-striate, testaceous with an irregular pattern of darker markings. Legs testaceous, the apical portion of the femora black, and the tibiae with the apex darker, the four posterior tibiae strongly notched at the apex. Underside testaceous, the ventral segments of the abdomen about equal and almost impunctate.

British N. Borneo: Mt. Kinabalu, Pakka, 10,000 ft., 23.iii.1929, *H. M. Pendlebury*; 3 specimens, 1 ♂ 2 ♀♀.

Type in the British Museum, ♂. Described from 1 ♂ 2 ♀♀.

This belongs to the genus *Nodostella* proposed by Jacoby for *Nodostoma elongata* Jac., which should probably include many elongate species in the genus *Nodostoma*.

Colaspoides vitiensis sp. n.

Reddish-brown, with a metallic gloss, the antennae and legs slightly paler. L. 4·50 mm.

Head depressed, distinctly punctured, more closely between the eyes; antennae elongate, extending a little beyond the middle of the elytra, the second segment half as long as the first and third, the third to the sixth subequal to each other, the four apical segments a little shorter and broader; prothorax transverse very convex, contracted in front, with large irregularly distributed punctures; scutellum impunctate, subtriangular; elytra with not very dense, but rather large punctures, becoming smaller and in regular striae posteriorly; legs slightly paler and pubescent, the femora unarmed; sternum shining and impunctate, the ventral segments of the abdomen with short scarce pubescence, the first segment the longest, about equal to the three following, the second to the third about equal to each other.

Fiji Islands: Makogai, Viti-Levu, 20.i.1921, *Dr. H. S. Evans*; 1 ♀ specimen, type. Tamavua, 24.v.1927, *H. W. Simmonds*, 1 specimen ♀. Nausori, x.1930, *R. Veitch*; 2 specimens ♀♀.

Type in British Museum. Described from 4 females.

Somewhat allied to *C. tarsalis* Lea but differs in size and in the punctures, and belongs to the group with femora unarmed.

HALTICINAE.

Chabria kinabalensis sp. n.

Black, the head and thorax nitid, the elytra rugosely and somewhat confluently punctured, almost shagreened, strongly rounded and very convex, black, each with a round flavous spot at the base. L. 3 mm.

Head black and nitid, the antennae black and extending slightly beyond the base of the elytra, the eight terminal segments pubescent and about equal to each other, the three basal glabrous and obscurely fulvous. Prothorax transverse, black, nitid, impunctate, the sides feebly rounded, the anterior angles oblique. Scutellum black triangular. Elytra rugosely and somewhat confluently punctured, strongly convex, rounded, widest behind the middle, a round flavous spot in the middle of each at the base, their epipleurae very broad. Legs black, the posterior femora incrassate, the tibiae with a distinct spine at the apex. Underside black and nitid, the metasternum with a horseshoe-shaped plate, the ventral segments of the abdomen about equal to each other, almost impunctate.

BRITISH N. BORNEO: Mt. Kinabalu, Pakka, 10,000 ft., 23.iii.1929, *H. M. Pendlebury*; 5 specimens.

Closely allied to *C.* (*Sphaeroderma*) *bimaculata* Jac., from Sumatra, but differs in the very rugosely punctured elytra and its larger size.

Type in the British Museum. Described from 5 specimens.

Nesohaltica vitiensis sp. n.

Oblong, shining black; antennae fulvous with the four apical segments fuscous. Legs and underside pitch brown. L. 2 mm.

Head with the basal half shining black, impunctate, the front pitch brown, a transverse impressed line between the eyes; antennae extending almost to the middle of the elytra, the seven basal segments fulvous, the four terminal fuscous, the first segment longer and more swollen than the second, the remainder more slender and about equal to each other. Prothorax shining black, transverse very finely and sparingly punctured, the sides slightly rounded and margined, the anterior angles obliquely truncate. Scutellum shining black, impunctate, triangular. Elytra shining black, strongly and somewhat closely punctured, the sides parallel and rounded at the apex, the side margins with a line of evenly spaced punctures which are much stronger than the other elytral punctures. Legs and underside pitch brown.

FIJI ISLANDS: Labasa, ix.1932, *R. Veitch*; 1 specimen, type. TAVEUNI, 29.ii.1924, *Dr. H. S. Evans*; 1 specimen, from Guava spinney.

Type in the British Museum. Described from 2 specimens.

Closely allied to *N. atra* Bryant from New Hebrides, but differs in its more shining black appearance and the punctation of the elytra.

Crepidodera evansi sp. n.

Elongate-ovate, nitid, fulvous, with the exception of the five apical segments of the antennae, the suture and sides of the elytra fuscous. L. 3 mm.

Head fulvous, nitid, impunctate, a short longitudinal carina between the base of the antennae, head with the eyes, not so broad as the prothorax. Antennae extending almost to the middle of the elytra, the six basal segments fulvous, the five terminal fuscous and slightly pubescent, the two basal segments more swollen than the remainder, the second about half as long as the first, the third and fourth about equal, each longer than the second, the fifth slightly longer than the fourth or sixth. Prothorax fulvous, nitid, impunctate,

transverse, the sides feebly rounded, slightly contracted at the base, the anterior angles oblique, a transverse sulcus at the base not very deep, terminated at each end by a short longitudinal sulcus. Elytra about twice as long as the head and prothorax together, fulvous, the suture and sides fuscous, feebly punctate-striate, the apical portion impunctate, feebly carinate at the sides, widest behind the middle and rounded at the apex. Legs fulvous, the apical third of the posterior tibiae finely toothed. Underside fulvous.

Fiji Islands : Taveuni, Quilai, 800 ft., 18.x.1924, *Dr. H. S. Evans*; 2 specimens.

Type in the British Museum. Described from 2 specimens.

Easily distinguished from *C. nigra* Bryant, the only described species from Fiji, by its larger size, colour, etc.

Alema nigra sp. n.

Shining black, with the exception of the antennae, clypeus, palpi and legs fulvous. L. 2 mm.

Head with the eyes rather large, the basal portion shining black and impunctate, the space between the eyes elevated, the clypeus and mouthparts fulvous. Antennae long and slender, the first segment thicker than the following, the second rather shorter than the first, the remainder elongate and slender, about equal to each other, the five terminal segments are tinged with fuscous and pubescent. Prothorax shining black, feebly punctured, scarcely broader than the head, subquadrate, slightly depressed near the base, the sides feebly margined. Scutellum black and impunctate. Elytra shining black, finely punctate-striate, the interstices being slightly elevated, elongate, the sides nearly parallel, tapering sharply to the apex, the extremity of the pygidium slightly projecting beyond the elytra. Legs fulvous. Underside shining black, metasternum impunctate, the first ventral segment of the abdomen very long, about equal to the following three, which are all short and about equal, the apical segment long and feebly punctured.

Fiji Islands : Lautoka Mts., 23.x.1921, *W. Greenwood*; 1 specimen.

Type in the British Museum. Described from 1 specimen.

I prefer to place this in the genus *Alema* Sharp, but it may form a connecting link between this and *Liprus* Motschulsky.

Psylliodes simmondsi sp. n.

Elongate-ovate, above purple black, the antennae legs and underside fulvous. L. 2·5 mm.

Head with the basal half black, impunctate, the clypeus and palpi fulvous. Antennae fulvous, with the five terminal segments tinged with fuscous, extending to the middle of the elytra, the two basal segments the stoutest. Prothorax black with purple reflections, feebly and not closely punctured, widest at the base, contracted in front, the anterior angles obtuse. Scutellum triangular, impunctate. Elytra purple black, broader than the base of the prothorax, the sides subparallel and rounded at the apex, irregularly punctured, the punctures stronger and closer than on the prothorax. Legs fulvous, the hind femora tinged with fuscous, the apical process of the hind tibiae is short and tridentate. Underside fulvous, the ventral segments of the abdomen paler.

Fiji Islands : Tamavua, 3.iv.1927, *H. W. Simmonds*; 1 specimen.

Type in the British Museum. Described from 1 specimen.

Somewhat allied to *P. quadridentata* Baly from West Australia, on account of the short apical process to the hind tibiae.